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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
THOMAS, LUCY M	

ART UNIT	PAPER NUMBER
2836	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/698,893	LIN ET AL.	
	Examiner	Art Unit	
	Lucy Thomas	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 and 3-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hollenbeck (US 5,513,058) in view of Krohn et al. (US 5,076,761). Regarding Claim 1, Hollenbeck discloses an over voltage protective device 100 (Figures 1 and 2) in parallel connection with a direct-current (DC motor) 104, comprising: a voltage dividing circuit having two opposite ends and a voltage dividing node (see voltage dividing circuit formed by 222, 224 with voltage dividing node 208 in Figure 2) having one end thereof is electrically connected to an input voltage of the DC motor (see one end connected to VL), and the opposite end thereof is electrically connected to ground; and a control unit (see 210, 220, 218, 118 in Figure 1, Column 5, lines 59-65) being connected with the voltage dividing circuit 208 of the voltage dividing circuit (see voltage dividing circuit formed by 222, 224 in Figure 1), and for accessing a voltage level of the part of the voltage-dividing circuit to further drive the DC motor, wherein when a voltage level of the part is larger than a predetermined reference voltage in the control unit (reference voltage is inherently predetermined by design and assembly process), the control unit sends an over voltage signal to shunt current in DC link (see Abstract, Column 1, lines 6-11, Column 4, lines 44-67).

Hollenbeck's device differs from the invention in that the control unit does not stop driving the motor in response to an over voltage signal as the over voltage is detected during the slowing of the motor.

Krohn teaches an over voltage protective device for DC motors having a control circuit 90 which to drive DC motor 50 and stop driving the motor when an over voltage condition occurs (see 130 and signal from 130 to motor drive 80, Column 1, lines 21-54). It would have been obvious to those skilled in the art at the time the invention was made to modify Hollenbeck's device and to provide additional safety features to stop driving the motor in response to an over voltage signal (by sending the over voltage signal to the motor drive unit) as taught by Krohn, to protect the DC motor from over voltage conditions which may occur as result of line voltage fluctuations, over current conditions, or over-pressure conditions due to component failures (see Krohn, Column 1, lines 48-54).

Regarding Claim 3, Hollenbeck discloses a voltage divider circuit, wherein the reference voltage is a product of the rated voltage of the DC motor, a reciprocal of a total resistance of the voltage-dividing circuit, and a resistance of the part of the voltage-dividing circuit (Column 5, lines 1-9).

Regarding Claim 4, Hollenbeck discloses a voltage divider circuit, which is composed of a first resistor 222 and a second resistor 224, and the part of the voltage dividing circuit is the second resistor (Column 5, lines 56-65).

Regarding Claim 5, Hollenbeck discloses a micro control unit (MCU) driver (see 118 in Figure 1). Regarding Claim 6, Hollenbeck discloses a brushless DC motor (see Column 1, lines 6-11, brushless DC motors are used as a DC fan motors).

Regarding Claim 7, Hollenbeck discloses an over voltage protective device of DC motor (Figures 1 and 2) having a plurality of switches 130, comprising: a first resistor 222 with one end thereof electrically connected to an input end voltage of the DC motor; a second resistor 224 with one end thereof electrically connected to the other end of the first resistor, and the other end thereof connected to ground; and a micro control unit (MCU) driver (see control unit elements 210, 220, 218, 118), having a plurality of output terminals driving the power switches 130, and for accessing a terminal voltage of the second resistor (see 210 connected to node 208); wherein when a voltage level of the part is larger than a predetermined reference voltage in the micro control unit driver (reference voltage is inherently predetermined by design and assembly process), the control unit sends an over voltage signal to shunt current in DC link (see Abstract, Column 1, lines 6-11, Column 4, lines 44-67).

Hollenbeck's device differs from the invention in that the control unit does not stop driving the motor in response to an over voltage signal as the over voltage is detected during the slowing of the motor.

Krohn teaches an over voltage protective device for DC motors (see Figure 1) having a control circuit 90 stop driving the motor when an over voltage condition occurs (see over voltage circuit 130 and output of 130 going to power supply 20 and motor control 90, and motor drive 80, see also, Column 1, lines 21-54). It would have been

obvious to those skilled in the art at the time the invention was made to modify Hollenbeck's device and to provide additional safety features to stop driving the motor in response to an over voltage signal (by sending the over voltage signal to the motor drive unit) as taught by Krohn, to protect the DC motor from over voltage conditions which may occur as result of line voltage fluctuations, over current conditions, or over-pressure conditions due to component failures (see Krohn, Column 1, lines 48-54).

Regarding Claim 8, Hollenbeck discloses an over voltage protective device of DC motor, wherein the reference voltage is a product of the input voltage of the DC motor, a reciprocal of the sum of resistances of the first resistor and the second resistor, and a resistance of the second resistor (see voltage at node 208).

Regarding Claims 9, Hollenbeck discloses an over voltage protective device of DC motor (Figure 1) comprising: a first voltage dividing circuit 222, 224 having one end thereof electrically connected to an input end voltage of a DC motor, and the other end thereof connected to ground; a second voltage dividing circuit 226, 228 having one end electrically connected to a reference voltage end, and the other end connected to ground; a control unit for controlling the start of the DC motor (see 210, 200, 218, 118 in Figure 1, Column 5, lines 59-65); and an operation amplifier 210 having a non-inverted input end electrically connected to the voltage dividing node, an inverted input end thereof electrically connected to the second voltage dividing circuit, and an output end thereof electrically connected to the control unit; wherein when a voltage level of the part is larger than a reference voltage, the control unit sends an over voltage signal to shunt current in DC link (see Abstract, Column 1, lines 6-11, Column 4, lines 44-67).

Hollenbeck's device differs from the invention in that the control unit does not stop driving the motor in response to an over voltage signal as the over voltage is detected during the slowing of the motor (but does stop driving the motor in response to an under voltage signal).

Krohn teaches an over voltage protective device for DC motors (see Figure 1) having a control circuit 90 stop driving the motor 50 when an over voltage condition occurs (see over voltage circuit 130 and output of 130 going to power supply 20 and motor control 90, and motor drive 80, see also Column 1, lines 21-54). It would have been obvious to those skilled in the art at the time the invention was made to modify Hollenbeck's device and to provide additional safety features to stop driving the motor in response to an over voltage signal (by sending the over voltage signal to the motor drive unit) as taught by Krohn, to protect the DC motor from over voltage conditions which may occur as result of line voltage fluctuations, over current conditions, or over-pressure conditions due to component failures (see Krohn, Column 1, lines 48-54).

Regarding Claim 10, Hollenbeck discloses a DC motor protection device, wherein the first voltage-dividing circuit comprises a first resistor 222, and a second resistor 224, the second voltage-dividing circuit comprises a third resistor 226 and a fourth resistor 228, the non-inverted input end of the operation amplifier is electrically connected between the first resistor and the second resistor, and an inverted input end of the operation amplifier is electrically connected between the third resistor and the fourth resistor. Regarding Claim 11, Hollenbeck discloses an operational amplifier 210, which is used as a comparator. Regarding Claim 12, Hollenbeck discloses a control

unit 118, which is a drive IC. Regarding Claim 13, Hollenbeck discloses a brushless DC motor (see Column 1, lines 6-11, brushless DC motors are used as a DC fan motors).

Regarding Claim 14, Hollenbeck discloses an over voltage protective device of DC motor (Figure 1) having plurality of power switches 130, comprising: a first resistor 222 with one end thereof electrically connected to a voltage input end of the DC motor; a second resistor 224 with one end thereof connected to the other end of the first resistor, and the other end thereof connected to ground; a third resistor 226 with one end thereof connected to a reference voltage end VREF; a fourth resistor 228 with one end thereof electrically connected to the other end of the third resistor, and the other end thereof grounded; a drive IC (see 118 of control unit comprising 210, 220, 218, 118) having a plurality of output terminals for respectively driving the power switches 130; and a comparator 210 having a non-inverted input end thereof connected between the first resistor and the second resistor, and an output end thereof electrically connected to the drive IC; wherein, when a voltage at the non-inverted input end is larger than a voltage at the inverted input end, the comparator outputs an over voltage signal to shunt current in DC link (see Abstract, Column 1, lines 6-11, Column 4, lines 44-67).

Hollenbeck's device differs from the invention in that the drive IC does not stop driving the power switches in response to an over voltage signal as the over voltage is detected during the slowing of the motor.

Krohn teaches an over voltage protective device for DC motors (see Figure 1) having a control circuit 90 stop driving the power switches 80 when an over voltage condition occurs (see over voltage circuit 130 and output of 130 going to power supply

20 and motor control 90, and motor drive 80, see also Column 1, lines 21-54). It would have been obvious to those skilled in the art at the time the invention was made to modify Hollenbeck's device and to provide additional safety features to stop driving the motor in response to an over voltage signal (by sending the over voltage signal to the motor drive unit) as taught by Krohn, to protect the DC motor from over voltage conditions which may occur as result of line voltage fluctuations, over current conditions, or over-pressure conditions due to component failures (see Krohn, Column 1, lines 48-54).

Regarding Claim 15, Hollenbeck discloses that the reference voltage is set corresponding to the minimum rotational speed of the rotor, which corresponds to the rated voltage of the motor (Column 5, lines 1-9).

Regarding Claim 16, Hollenbeck discloses the control unit further comprises four output terminals (118 drives several switches and therefore has several output terminals) and the DC motor further comprises two power switches 130, each of the output terminals respectively controlling a corresponding one of the four power switches.

Regarding Claim 17, Hollenbeck discloses the over voltage protective device, wherein the control unit further comprises two output terminals L2, L6 (see Figure 3B) and the DC motor further comprises two power switches (see 314, 316 of 130 in Figure 3B), each of the output terminals respectively controlling a corresponding one of the two power switches. Regarding Claim 18, Hollenbeck discloses the over voltage protective device, further comprising a second voltage dividing circuit and an operational amplifier

(see voltage dividing circuit comprised of 226, 228 and the operational amplifier 210 in Figure 1), wherein the second voltage dividing circuit includes two resistors, 226, 228.

Response to Arguments

3. Applicant's arguments filed on 10/15/2007 have been fully considered.

4. Regarding Applicant's arguments toward Hollenbeck and Krohn references: Hollenbeck reference teaches all elements of Claim 1, including the control unit (see 210, 220, 218, 118 in Figure 1, 210 is connected to the voltage dividing node 208 of the voltage dividing circuit (formed of resistors 222 and 224 in Figure 1) to accessing a voltage level of the part of the voltage dividing circuit, to further drive the DC motor. The control unit of Hollenbeck includes element 118 to drive the DC motor 104 and element 210 connected with the voltage dividing node of the voltage dividing circuit. Hollenbeck's control unit does not stop driving the DC motor in response to the over voltage signal (but does stop driving the motor in response to an under voltage signal). Hollenbeck's control unit shunts current in DC link when the over voltage signal is received.

Krohn reference is relied upon solely for the teaching of a control unit which stops driving the motor in response to an over voltage signal, and the motivation, to protect the DC motor from over voltage conditions which may occur as result of line voltage fluctuations, over current conditions, or over-pressure conditions due to component failures (see Krohn, Column 1, lines 48-54). Therefore, the references in combination, teach all elements of Claim 1.

The Applicant argues that the elements of Hollenbeck's control unit are different than the control unit recited in the Claim, however, Claim1 only recites a control unit, not other elements.

The Applicant states that signals from the voltage monitoring circuit 130 would go to power supply 20 (according to arrow illustrated in Fig. 1), rather than Motor control 90 or Motor Drive 80. Power supply 20 line is connected to 130 to the right side, and the signal output from the left goes to circuit breaker 10, and to 90 and 80 (see signal path from the left to the lower side and to the right side, and to 90, and 80). Also, Column 1, lines 48-54, recites, all these conditions (over-voltage, over-current, over-pressure, motor stall, motor runway) can lead to damage and destruction to the DC motor, or to the speed control circuits which drive the motor, and therefore, it is important that safety features be incorporated to monitor these conditions and provide a *safe operating shutdown* in the event of any of these conditions occur.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lucy Thomas whose telephone number is 571-272-6002. The examiner can normally be reached on Monday - Friday 8:00 AM - 4:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on 571-272-2084. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LT
November 17, 2007

11/21/07
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